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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/594,405	09/26/2006	Atsushi Fukaya	8007-1117	1916

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YOUNG & THOMPSON  
209 Madison Street  
Suite 500  
Alexandria, VA 22314

EXAMINER
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CANTELMO, GREGG

ART UNIT	PAPER NUMBER
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1795

NOTIFICATION DATE	DELIVERY MODE
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03/31/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/594,405	<b>Applicant(s)</b> FUKAYA ET AL.	
	<b>Examiner</b> Gregg Cantelmo	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10, 15-18 and 21-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 15-18 and 21-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. In response to the amendment received December 15, 2009:
  - a. Claims 1-10 15-18 and 21-26 are pending;
  - b. The claim objections have been withdrawn in light of the amendment;
  - c. The 112 rejection is withdrawn;
  - d. The previous 102 rejection is withdrawn;
  - e. The 103 rejections stand as modified in light of the amendment

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-2, 7-10, 15-18 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2003-163032 (Go) in view of JP 2004-039510 (Awano).

Go discloses a nonaqueous electrolyte composition comprising an organic solvent and an electrolyte salt dissolved in the organic solvent, the organic solvent being a mixed organic solvent comprising (a) 20% to 35% by volume of ethylene carbonate, (b) 35% to 45% by volume of ethyl methyl carbonate, (c) 15% to 35% by volume of dimethyl carbonate, and (d) 3% to 15% by volume of diethyl carbonate or propylene carbonate (para. 38 as applied to claim 1).

The organic solvent comprises (a) 25% to 35% by volume of ethylene carbonate, (b) 35% to 45% by volume of ethyl methyl carbonate, (c) 18% to 32% by volume of

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dimethyl carbonate, and (d) 3% to 10% by volume of diethyl carbonate or propylene carbonate (para. 38 as applied to claim 2).

The salts include similar salts as recited in claim 7 (see para. 25 as applied to claim 7-10).

The electrolyte above is employed in a secondary battery comprising the nonaqueous electrolyte above, a positive electrode and a negative electrode (as applied to claims 15-18 and 23-24).

The difference between Go and claim 11 is that Go does not teach of the electrolyte silicon additive.

Awano teaches of adding the same silicon compounds to a nonaqueous electrolyte solution (abstract). The additive improves the cycle characteristics, low temperature characteristics, and long term stability of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Go by adding the silicon compound of Awano to the electrolyte since it would have improved the cycle characteristics, low temperature characteristics, and long term stability of the battery.

3. Claims 1, 2, 7-10, 15-18 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2003/0113634 (Oh) in view of Awano.

Oh discloses a nonaqueous electrolyte composition comprising an organic solvent and an electrolyte salt dissolved in the organic solvent, the organic solvent being a mixed organic solvent comprising (a) 20% to 35% by volume of ethylene

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carbonate, (b) 35% to 45% by volume of ethyl methyl carbonate, (c) 15% to 35% by volume of dimethyl carbonate, and (d) 3% to 15% by volume of diethyl carbonate or propylene carbonate (example 3 as applied to claim 1).

The organic solvent comprises (a) 25% to 35% by volume of ethylene carbonate, (b) 35% to 45% by volume of ethyl methyl carbonate, (c) 18% to 32% by volume of dimethyl carbonate, and (d) 3% to 10% by volume of diethyl carbonate or propylene carbonate (Example 3 as applied to claim 2).

The salts include similar salts as recited in claim 7 (paras. 35 and 43 as applied to claim 7-10).

The electrolyte above is employed in a secondary battery comprising the nonaqueous electrolyte above, a positive electrode and a negative electrode (experimental examples as applied to claims 15-18 and 23-24).

The difference between Oh and claim 11 is that Oh does not teach of the electrolyte silicon additive.

Awano teaches of adding the same silicon compounds to a nonaqueous electrolyte solution (abstract). The additive improves the cycle characteristics, low temperature characteristics, and long term stability of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Oh by adding the silicon compound of Awano to the electrolyte since it would have improved the cycle characteristics, low temperature characteristics, and long term stability of the battery.

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4. Claims 1, 7-10, 15-18 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over CA 2334054 (Gan) in view of Awano.

Gan discloses a nonaqueous electrolyte composition comprising an organic solvent and an electrolyte salt dissolved in the organic solvent, the organic solvent being a mixed organic solvent comprising (a) 20% to 35% by volume of ethylene carbonate, (b) 35% to 45% by volume of ethyl methyl carbonate, (c) 15% to 35% by volume of dimethyl carbonate, and (d) 3% to 15% by volume of diethyl carbonate or propylene carbonate (table 4 as applied to claim 1).

The salts include similar salts as recited in claim 7 (page 17, ll. 26-33 as applied to claim 7-10).

The electrolyte above is employed in a secondary battery comprising the nonaqueous electrolyte above, a positive electrode and a negative electrode (examples as applied to claims 15-18 and 23-24).

The difference between Gan and claim 11 is that Gan does not teach of the electrolyte silicon additive.

Awano teaches of adding the same silicon compounds to a nonaqueous electrolyte solution (abstract). The additive improves the cycle characteristics, low temperature characteristics, and long term stability of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Gan by adding the silicon compound of Awano to the electrolyte since it would have improved the cycle characteristics, low temperature characteristics, and long term stability of the battery.

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5. Claims 6, 22 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh in view of Awano as applied to claim 1 above.

According to Oh, the salts include similar salts as recited in claim 7 (see para. 25 as applied to claim 26).

The electrolyte above is employed in a secondary battery comprising the nonaqueous electrolyte above, a positive electrode and a negative electrode (as applied to claim 22).

Example 3 of Oh teaches of a solvent mixture comprising EC/EMC/DMC/PC at a ratio of 30/35/25/10.

Claim 6 is directed to a solvent mixture comprising EC/EMC/DMC/PC at a ratio of 25/40/30/5.

In the broader sense, Example 3 is a quaternary solvent mixture which falls within the inventive concept of the instant application and the only differences between Example 3 of Oh and claim 6 are the ratios of EC/EMC (30/35 compared to 25/40) and the ratio of DMC/PC (25/10 compared to 30/5). These differences are held to be obviously minor differences in ranges and the prior art solvent mixture and minor variations therein would have been obvious to one of ordinary skill in the art. It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

6. Claims 3-5, 19-20, 21 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gan in view of Awano as applied to claim 1 above.

According to Gan:

The salts include similar salts as recited in claim 7 (page 17, ll. 26-33 as applied to claim 25)

The electrolyte above is employed in a secondary battery comprising the nonaqueous electrolyte above, a positive electrode and a negative electrode (examples as applied to claims 15-18 and 21).

With respect to claim 3:

Gan teaches of a solvent mixture comprising EC/EMC/DMC/DEC at various ratios which fall within the range of the inventive concept of the instant application. For example, in Table 4, Example 2, the ratio of EC/EMC/DMC/DEC is 30/32/28/10. Comparatively claim 3 recites a ratio of EC/EMC/DMC/DEC which is 30/40/20/10.

In the broader sense, Example 2 in table 4 is a quaternary solvent mixture which falls within the inventive concept of the instant application and the only difference between Example 2 of Gan and claim 3 is the ratios of EMC/DMC (32/28 compared to 40/20). This difference is held to be obviously minor differences in ranges and the prior art solvent mixture and minor variations therein would have been obvious to one of ordinary skill in the art. It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor.

Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

Similarly with respect to claim 5:

Gan teaches of a solvent mixture comprising EC/EMC/DMC/DEC at various ratios which fall within the range of the inventive concept of the instant application. For example, in Table 4, Example 2, the ratio of EC/EMC/DMC/DEC is 30/32/28/10. Comparatively claim 3 recites a ratio of EC/EMC/DMC/DEC which is 25/40/25/10.

In the broader sense, Example 2 in table 4 is a quaternary solvent mixture which falls within the inventive concept of the instant application and the only differences between Example 2 of Gan and claim 5 is the ratios of EC/EMC/DMC (30/32/28 compared to 25/40/25). This difference is held to be obviously minor differences in ranges and the prior art solvent mixture and minor variations therein would have been obvious to one of ordinary skill in the art. It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

Similarly with respect to claims 4, 19 and 20:

Gan teaches of a solvent mixture comprising EC/EMC/DMC/DEC at various ratios which fall within the range of the inventive concept of the instant application. For example, in Table 4, Example 2, the ratio of EC/EMC/DMC/DEC is 30/32/28/10. Comparatively claim 3 recites a ratio of EC/EMC/DMC/DEC which is 25/40/30/5.

In the broader sense, Example 2 in table 4 is a quaternary solvent mixture which falls within the inventive concept of the instant application and the only difference, which is relatively minor, between Example 2 of Gan and claim 5 is the ratio of EC/EMC/DMC/DEC (30/32/28/10 compared to 25/40/30/5). This difference is held to be obviously minor differences in ranges and the prior art solvent mixture and minor variations therein would have been obvious to one of ordinary skill in the art. It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

### ***Response to Arguments***

7. Applicant's arguments filed December 15, 2009 have been fully considered but they are not persuasive.

Applicant argues Awano fails to disclose the unique combination of organic solvent components and silicon compound recited in the claims.

The Examiner respectfully disagrees. The rejection of record does not rely solely on the teachings of Awano and the Examiner maintains that the prior art rejections of record obviate the addition of the silicon additive taught by Awano to the electrolyte compositions of either Go, Oh or Gan as discussed above.

Awano teaches of adding the same silicon compounds to a nonaqueous electrolyte solution (abstract). The additive improves the cycle characteristics, low temperature characteristics, and long term stability of the battery.

Awano also teaches of providing a cyclic carbonate, such as EC in an amount from 20-50% and acyclic carbonates, such as DMC, EMC and DEC in an amount from 50-80% (col. 4, line 42 through col. 5, line 65 of U.S. Patent Application Publication No. 20040007688 which, as recognized by Applicant, is the apparent English language counterpart to Awano (JP 2004-039510)). Thus Awano generically teaches having a higher ratio of acyclic carbonates to cyclic carbonates, similar to that which is claimed. Awano further teaches that all of these solvents can work in combination with the silicon compound and thus broadly teaches of the combination of a mixture of cyclic and acyclic solvents along with the silicon additive compound. The combination is recognized by Awano to produce an electrolyte composition which exhibits excellent low-temperature characteristics and cycle characteristics over those electrolytic solutions containing no silicon additive (see col. 13 of Awano).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of either Go, Oh or Gan by adding the silicon compound of Awano to the electrolyte since it would have improved the cycle characteristics, low temperature characteristics, and long term stability of the battery.

Applicant argues that the composition of the present invention yield results which are demonstrably greater, superior and unexpected relative to the cited prior art. Applicant then states that Comparative Examples 3-1 and 3-2 were formed using electrolyte compositions with Examples 1 and 2 of Awano and that Examples 3-3 and 3-4 of the declaration also teach of electrolyte compositions formed in accordance with

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Examples 1 and 2 of Awano. Applicant then proceeds to allege that results between the teachings and examples 1 and 2 of Awano to the data of various inventive examples are significantly higher for the inventive examples compared to examples 1 and 2 of Awano. Applicant concludes that the declaration demonstrates a unique combination of organic solvent mixture and silicon compound which were not contemplated by Go, Oh or Gan and significantly unexpectedly exceed what is shown by Awano.

The arguments and evidence provided therein has been considered but is not deemed to establish evidence of results which are demonstrably greater, superior and unexpected over the prior art of record and notably the prior art rejections of record.

Any differences between the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Furthermore, a greater additive effect is not necessarily sufficient to overcome a prima facie case of obviousness because such an effect can either be expected or unexpected. Applicants must further show that the results were greater than those which would have been expected from the prior art to an unobvious extent, and that the results are of a significant, practical advantage. Ex parte The NutraSweet Co., 19 USPQ2d 1586 (Bd. Pat. App. & Inter. 1991)

Where Applicant's arguments and the declaration fail is that it does not provide evidence that the results are unexpected from the combination of teachings of the prior art relied upon in the rejections of record.

Applicant's declaration is further held to be more akin to a piecemeal analysis of the prior art since it makes a comparison between the inventive embodiments and Awano alone. However it should be apparent that the prior art rejection is a combination of teachings, which rely on Awano, in part and the arguments and declaration fail to overcome the obviousness rationale for combining the teachings of the references as set forth in the prior art rejections of record. As discussed above while neither Go, Oh or Gan teach of the silicon additive, the addition of such would have been obvious to one of ordinary skill in the art given the teachings of Awano.

Awano teaches of adding the same silicon compounds to a nonaqueous electrolyte solution (abstract and citations as discussed above). The additive is present in combination with a solvent mixture of cyclic and acyclic carbonates which improves the cycle characteristics, low temperature characteristics, and long term stability of the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of either Go, Oh or Gan by adding the silicon compound of Awano to the electrolyte since it would have improved the cycle characteristics, low temperature characteristics, and long term stability of the battery. In providing the silicon additive to the electrolyte solvents of Go, Oh or Gan one of ordinary skill in the art would reasonably expect that the resultant combination would expectedly exhibit the same properties and characteristics described in the instant application.

Thus the argument that the results are demonstrably greater, superior and unexpected over the prior art of record and notably the prior art rejections of record is not persuasive.

In response to applicant's argument that none of the prior art expressly teach the specific electrolyte combination in addition to the silicon additive the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Again as discussed above, each of Go, Oh and Gan teach of the same solvent mixture in the same proportions as claimed. Awano, teaches of providing a silicon additive to solvent mixtures of cyclic and acyclic carbonates, improves the cycle characteristics, low temperature characteristics, and long term stability of the battery. Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of either Go, Oh or Gan to further include the silicon additive as taught by Awano since it would have expectedly improved the cycle characteristics, low temperature characteristics, and long term stability of the battery and the resultant combination of the solvent mixtures of either Go, Oh or Gan with the silicon compound additive of Awano would have expectedly produced the same properties and characteristics of the disclosed and claimed invention.

Thus this argument is not persuasive.

Applicant further alleges that Awano teaches that the silicon compound of formula 1 is referred to in the comparative examples of Awano and is described as being insufficient for improving cycle characteristics.

The Examiner respectfully disagrees.

Awano teaches of more specific compounds than the general formula I as is shown in Table I. Table I clearly denotes more specific silicon compounds used as comparative compounds A and B. Therefore Awano is not held to teach that the general formula I is insufficient but that there are differences between the examples and the silicon additives therein compared to the specific silicon compounds used in comparative examples 1 and 2 of Awano. Awano defines a generic silicon compound I but then proceeds to refer to a variety of distinct compounds 1-14 which are variants of the generic structure of compound 1 of Awano and which are different from the structures of comparative example compounds A and B in Awano.

Again as discussed above, each of Go, Oh and Gan teach of the same solvent mixture in the same proportions as claimed. Awano, teaches of providing a silicon additive to solvent mixtures of cyclic and acyclic carbonates, improves the cycle characteristics, low temperature characteristics, and long term stability of the battery. Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of either Go, Oh or Gan to further include the silicon additive as taught by Awano since it would have expectedly improved the cycle characteristics, low temperature characteristics, and long term stability of the battery and the resultant combination of the solvent mixtures of either Go, Oh or Gan

with the silicon compound additive of Awano would have expectedly produced the same properties and characteristics of the disclosed and claimed invention.

Thus this argument is not persuasive.

### ***Conclusion***

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gregg Cantelmo/  
Primary Examiner, Art Unit 1795